REMARKS

Applicants respectfully request reconsideration of the above-captioned application as amended.

In an Office Action dated December 19, 1994, claims 1-18 were rejected and the drawings and specification were objected to. By means of this amendment, claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17, and 18 have been amended. Claims 1-18 are still pending herein, of which only claim 1 is in independent form.

In the Office Action, the drawings were objected to for failure to show how the valve member (21 or 22) is attached to the head and shaped to concurrently control fluid flow through various "breaches" (herein amended to "passages") as described in the specification. Applicants believe that the drawings, especially the newly submitted Figs. 1a and 1b, show how the valves 21 and 22 are shaped to concurrently control fluid flow through the various passages. Furthermore, Applicants respectfully submit that such valve members and their details are well known in the art. The specification, page 7 (lines 25-26) and page 8 (lines 1-3) specifically refers to three German publications for details of the valve bodies and possible drives of the same. Enclosed with this amendment is the referenced DE 33 29 790 A1, as well as the U.S. Patents 4,932,631 and 5,101,857, which are counterpart patents to the other referenced German publications. The valve bodies (13) in the DE publication, (2) in U.S. 4,932,631, and (6 or 51) in U.S. 5,101,857 are in principle comparable to the valve bodies (21 or 22) of the present specification. In view of this prior art, Applicants respectfully submit that the attachment and shape details of the valve member (21 or 22) can be considered known.

The drawings were further objected to under 37 C.F.R. § 1.83(a) for not showing the "overpressure free relief chamber" of claim 5. In response, Applicants have clarified this expression throughout the specification and the claims by replacing the word "chamber" with the word "environment". In the specification, page 10 (lines 7-8), the "chamber" (herein amended to "environment") is defined as the "atmosphere", in the case of air. The embodiments shown in the drawings utilize the atmosphere as the "overpressure free relief chamber (environment)". Typically, the atmosphere is represented by a space surrounding a structure in a drawing. Therefore, Applicants respectfully submit that this feature of the invention, i.e., the atmosphere, is represented in the drawings, in accordance with claim 5.

No new matter has been entered by the above described changes and clarifications. As such, Applicants respectfully request that the objections to the drawings be withdrawn.

In the Office Action, the specification was objected to under 35 U.S.C. § 112, first paragraph, for failing to provide an adequate written description of the invention. The Examiner cited various examples of unclear language, inadequate disclosure, and a dual numbering system, which was considered confusing. In response, Applicants have thoroughly reviewed the specification, and have clarified the language by word substitutions, as well as by making grammatical and typographical corrections throughout. In particular, the word "admixture" has been replaced by the word "additional", and the word "breach" has been replaced by the word "passage", to more clearly define the structural elements. These changes have been made consistently throughout the Abstract, specification, and claims. No new matter is introduced by these changes because they are closely supported by the drawings and merely constitute a change from awkward terminology to more accurately descriptive terminology.

Regarding the meaning of the term "overpressure", (referring to page 10), Applicants respectfully submit that this means a pressure greater than atmospheric pressure. This meaning is indicated in lines 7-8, where, in the case of air, "overpressure relief chamber(environment)" is equated to "atmosphere chamber (environment)". In the same sense, the expression "free of overpressure" (line 4) means a pressure equal to atmospheric pressure.

To clarify the differentiation between "idling" and "load" conditions, Applicants have replaced Figure 1 with Figures 1a and 1b, each of which differs from Figure 1 only with respect to the positioning of valve (21). Figure 1a shows valve (21) in the idling position, and Figure 1b shows valve (21) in the load position. A supportive description of the positioning of valve (21) in the idling and load conditions, as shown in Fig's. 1a and 1b, is found on page 8, lines 5-26, and on page 9, lines 1-8. Therefore, new Figures 1a and 1b do not constitute new matter over Figure 1, but simply serve to more clearly depict the disclosed positioning of valve (21).

The Examiner asserted that "pressure regulator control" and "governor control" had been inadequately disclosed. Applicants respectfully submit that "pressure regulator control" is disclosed on page 10, lines 3-10, and lines 16-21, while "governor control" is disclosed on page 10, lines 10-14, and lines 23-26, and on page 11, lines 1-14. Accordingly, the "pressure regulator control" occurs when, in the idling operation, the outlet chamber (15) is at atmospheric pressure, or in other words, when the compressor delivers into the atmosphere. Alternately, the "governor control" occurs when, in idling operation, the outlet chamber (15) is subjected to the system pressure. These conditions are clearly described at the passages cited above. Furthermore, Applicants respectfully submit that persons skilled in the art are aware that "pressure regulator control" finds its normal field of application in the United States, and that

"governor control" finds its application mainly in the continental European countries.

The phrase "especially great negative pressure" (page 14, line 12, etc.) has been replaced by this amendment with the more scientific term "partial vacuum" to clarify the terminology.

In order to clarify the description of the device utilizing two compression pistons, pages 16-23, as objected to by the Examiner, Applicants have modified various words and phrases, and have relocated a substantive explanatory paragraph (page 21, lines 20-23) to an earlier location in the discussion (page 18, line 4). The modified words include "admixture" (to "additional"), "breach(es)" (to "passage(es)"), as heretofore noted throughout the specification, and the modified terms "after-suction", "after-sucked gas", and "after-sucking" to "additional suction", "additional suction", and "additional suction effect", respectively, on page 20, lines 13-15. To further support the description of a device utilizing two compression pistons, Applicants have enclosed with this amendment a copy of a Clayton Dewandre brochure, entitled "Twin Cylinder Air Compressors", which Applicants believe is approximately 20 years old.

The dual numbering system for different embodiments (pages 14, 15 16), which the Examiner objected to, has been clarified in the specification by means of explanatory phrases (e.g., "in one embodiment" or "in another embodiment", as on page 14, lines 21-22 and page 15, lines 14-15). Furthermore, all the number references have been deleted from the claims, as amended herein.

Applicants respectfully submit that the above described corrections to the specification have addressed all of the Examiner's objections without the introduction of any new matter. Accordingly, Applicants respectfully request that the objections to the specification be withdrawn.

In the Office Action, the Examiner objected to claims 1-5, 9, 12, and 13-16 because of the use of a dual numbering system. In response, Applicants have deleted all number references throughout the claims as amended herein. As such, Applicants respectfully request that this objection be withdrawn.

Claims 1-18 were rejected under 35 U.S.C. § 112, first paragraph, for the same reasons (indicated above) as set forth in the objections to the specification. In response, Applicants have amended the specification and the claims, as previously described, so as to more clearly describe the invention. No new matter has been introduced. Accordingly, Applicants respectfully request that this objection be withdrawn.

Claims 1-3 were rejected under 35 U.S.C. § 102 (b) as being anticipated by Holdsworth (U.S. Patent 1,248,119, issued November 27, 1917). In response, Applicants have amended claims 1-3 to more clearly define the invention. No new matter has been introduced. As such, Applicants respectfully submit that amended claims 1-3 are patentable over the prior art of record for the reasons stated below as well as other reasons.

First, Applicants believe it is appropriate to review the invention. The claimed invention is directed to a gas compressor, switchable between load and idling operations, wherein the noise level is reduced during idling, as well as other improvements. As shown in Figure 1a, one embodiment of the gas compressor comprises a compression chamber (20), a suction chamber (8), which is connected via a suction valve made up of a passage (4) and an inlet valve body (21) to the compression chamber (20), an outlet chamber (15), which is connected via an outlet valve (17) and a passage (18) to the compression chamber (20), **and an additional chamber (7), which is connected during the idling operation to the compression chamber (20) by an**

additional valve, made up of a passage 10 and the inlet valve body 21.

The inlet valve body (21) can be shifted or swivelled by means of a drive, not shown, between an idling position and a load position as indicated by a double arrow (S). Figure 1a shows the valve body (21) in the idle position, and Figure 1b shows the valve body (21) in the load position. The inlet valve body (21) slides on the surface of a cylinder head (6) facing the compression chamber (20) during this movement. Thus, in the idle position (Fig.1a), the additional valve (passage 10 and valve body 21) is partially open, thereby allowing a gas (e.g., air) to flow between compression chamber (20) and additional chamber (7). When in the load position, however, as shown in Figure 1b, the additional valve (10, 21) is closed, thus isolating the additional chamber (7) from the compression chamber (20).

Referring again to Fig.1a (idle position), during the compression stroke, a piston (1) pushes the gas in the compression chamber (20) through the open additional valve (10, 21) into the additional chamber (7). This gas is thereby compressed to a pressure which depends on the size of the additional chamber (7). This pressure is called **"idling stabilization pressure"**. During the subsequent suction stroke of the piston (1), the gas flows through the open additional valve (10, 21) back into the compression chamber (20). Outlet chamber (15) is closed off during idling from compression chamber (20) by the action of outlet valve (17) or, alternately, by the closed area (24) of valve body (22), depending on the operational configuration, i.e., governor control or pressure regulator control.

An important feature of the invention is the aforementioned "idling stabilization pressure", which results from the gas interaction between the additional chamber (7) and the compression chamber (20), via the additional valve (10, 21). Thus, the proper design of the

additional chamber and additional valve for a particular gas compressor provides the benefit of noise reduction during idling, in addition to other benefits, as compared to the prior art which utilizes a check valve design.

This feature is claimed in amended independent claim 1, as follows:

...an **additional chamber** connected during said idling operation to said compression chamber via an **additional valve**.

Turning now to the prior art of record, Holdsworth teaches an air compressor with a suction valve (17), a suction chamber (13), an outlet chamber (14), and an outlet valve (21). Valve (21) is open during idling operation and connects the compression chamber **to the atmosphere**, through a pipe (24), a cylinder (25), and a vent opening (33). In stark contrast, claim 1, as amended, specifically claims an **additional chamber** which is connected to the compression chamber via an **additional valve** during idling. The claimed structure thus establishes the previously described "idling stabilization pressure" between the additional chamber and the compression chamber. There is no teaching or suggestion in Holdsworth to show the claimed structure.

Therefore, Applicants respectfully submit that independent claim 1 is patentable over Holdsworth. Specifically, no prior art reference of record teaches or suggests:

an **additional chamber** connected during idling operation to a compression chamber via an **additional valve**

as claimed in claim 1. As such, Applicants respectfully request that independent claim 1 be allowed over the prior art of record. Likewise, since dependent claims 2-18 depend from claim 1, Applicants respectfully submit that they too are patentable over the prior art of record.

In the Office Action, the Examiner indicated that claims 4-18 would be allowable if rewritten to overcome the rejection under 35 U.S.C. § 112, and to include all of the limitations of the base claim and any intervening claims. Applicants gratefully acknowledge the Examiner's indication that this application contains allowable subject matter. By means of the present amendment, the specification and claims have been amended in accordance with the Examiner's suggestions.

Applicants respectfully submit that the application is now in condition for allowance. Therefore, Applicants respectfully request a favorable action on the merits.

Respectfully submitted,

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Enclosures: Proposed Figs. 1a and 1b
DE 33 29 790 A1 (Schlossarczyk)
U.S. Patent No. 4,932,631 (Heger)
U.S. Patent No. 5,101,857 (Heger)
Clayton Dewandre brochure "Twin Cylinder Air Compressors"